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ABSTRACT

This teacher's guide and an audiovisual presentation comprise an instructional package in the Small Engine Repair Series for special needs students, primarily the mentally retarded and learning disabled. (The audiovisual material--56 slides or a 35mm filmstrip with cassette--is not available here.) A section of notes to the instructor lists equipment needed, preparation for teaching the instructional package, and information on using the package. Performance objectives are given for inclusion in the student's Individual Instructional Plan. The objective stated for the course is to enable students to define safety, recognize safety practices in the small engine repair shop, and demonstrate safety while learning the repair jobs on small gasoline engines. Other materials provided in the guide are transparency masters, a script for the audiovisual presentation, seven student activity sheets reinforcing information presented in the audiovisual material, answers to the activity sheets, and an evaluation chart. Materials are suitable for use as primary or supplementary instructional materials on the topic of safety. (YLB)

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SMALL ENGINE REPAIR SERIES

SAFETY WITH SMALL ENGINE REPAIR

Teacher's Guide

Prepared by Pamela Hill

Published by
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Teacher's Guide

for

Safety With Small Engine Repair

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PREFACE

SAFETY WITH SMALL ENGINE REPAIR, an instructional package in the Small Engine Repair Series, was developed, field-reviewed, and evaluated by vocational industrial teachers who teach students about repairing small engines. This material was developed as an extension of Comprehensive Small Engine Repair by the Mid-America Vocational Curriculum Consortium, Inc., and we recommend the two be used together.

This project, now in its third year, was initiated in 1979 because it was felt that special needs students enrolled in General Mechanical Repair programs in Texas needed more appropriate instructional materials to aid their learning. The aim of this project has been twofold: (1) To task analyze the typical repair jobs of small engines and then identify the minimum required information, safety, and work habits associated with each repair job; and (2) To present this material in a variety of ways that are consistent with learning styles of special needs students with cognitive dysfunctions--primarily, the mentally retarded and learning disabled.

SAFETY WITH SMALL ENGINE REPAIR is designed with a combination of different media approaches--audio, visual, and hands-on. It is anticipated that this balanced multimedia approach will not only provide an opportunity for students to experience learning from different angles, but will also make learning more interesting and easier. Included in SAFETY WITH SMALL ENGINE REPAIR are the following instructional materials:

Audiovisual: Safety with Small Engine Repair
Teacher's Guide: with accompanying student activities

Audiovisual

The audiovisual presentation is an introduction to general safety rules associated with small engine repair. The presentation is available in either filmstrip/cassette or slide/cassette style. It is short and concise, with simplified language to hold the interest of the special needs learner. The FOG index reading level of the audiovisual script is approximately 6.4 grades minus the technical words such as carburetor and gasoline.

Designed to be used in both group and individual instruction, the audiovisual presentation may be used before or after discussion and/or demonstration of safety rules. If repetition is needed in order for a student to complete the Student Activity Sheets, the presentation may also be viewed individually without teacher assistance. For the student who is an auditory learner or blind, listening to the cassette will be an important aid in that student's ability to learn about safety.

Teacher's Guide

The Teacher's Guide will help to provide successful learning experiences for the special needs student. Performance objectives are given for inclusion in a student's Individual Instructional Plan (IIP). Transparency masters, the audiovisual script, Student Activity Sheets, and an evaluation chart are provided to support a variety of teaching methods and individualization of instruction.

For further information or comment on SAFETY WITH SMALL ENGINE REPAIR or the Small Engine Repair Series, contact the Occupational Curriculum Laboratory, East Texas State University, Commerce, Texas 75428, (214) 886-5623.

ACKNOWLEDGMENTS

Recognition for the successful development of SAFETY WITH SMALL ENGINE REPAIR is given to the General Mechanical Repair Teacher's Advisory Committee who conscientiously gave of their knowledge and time. Special thanks is extended to the following advisory members who field reviewed the script and written materials of this audio-visual presentation:

Area			
I-A	Owen Hill	VEH-GMR	El Paso ISD
I	Pedro Ruiz	CVAE-GMR	Big Spring ISD
II	Gary Stephens	CVAE-GMR	Hurst-Euless-Bedford
III	Thaddeus Curry	CVAE-GMR	Houston ISD
IV	Robert Svetlik	CVAE-GMR	Hallettsville ISD
V	Robert Katzer	CVAE-GMR	San Marcos ISD
	Bob Warren	CVAE-GMR	San Marcos ISD
VI	Larry Kilbreth	CVAE-GMR	Pampa ISD
VII	Jesse (Bo) Swindle	CVAE-GMR	N. Lamar ISD
VIII	Rex Davis	CVAE-GMR	Newton ISD
IX	Fred Grimm	CVAE-GMR	Belton ISD
X	Vernon McGee	CVAE-GMR	Goose Creek ISD
XI	Charles Piggott	CVAE-GMR	Lyford ISD
XII	William Maroney	CVAE-GMR	Alamo Heights ISD

Special appreciation is given to Mr. Norman Ulmer, CVAE-GMR Instructor and his students at Greenville Junior High School who willingly allowed us to photograph them in their shop. Their supportive comments, enthusiasm, and insight into what safety is all about was an inspiration to us all in making this audiovisual presentation.

Appreciation is also extended to the University of Texas Health Science Center, Dallas, Texas, who allowed us to use four of their photographs in the Safety presentation. These photographs are of actual injuries; they are a sullen reminder of how important safety really is to all of us.

NOTES TO THE INSTRUCTOR

Introduction

SAFETY WITH SMALL ENGINE REPAIR is an audiovisual aid developed to introduce safety and help the student learn to recognize safety practices in the small engine repair field.

This instructional package consists of 56 full-color slides or a 35mm filmstrip, a cassette tape and a teacher's guide. The Teacher's Guide contains information on how to use this instructional package, the script for the audiovisual presentation, transparency masters, a student activity, and a student evaluation chart. These materials may be used as either primary or supplementary instructional materials for the topic of safety. The printed materials provided in the Teacher's Guide are not copyrighted and so they may be reproduced in any form for student use. There are no separately printed student materials for SAFETY WITH SMALL ENGINE REPAIR.

EQUIPMENT NEEDED

Before using this presentation, arrange to have the following equipment available:

- Projector (either carousel slide or filmstrip type)
- Carousel tray, if using slides
- Projector screen
- Cassette recorder
- Overhead projector and other equipment necessary for making transparencies
- Tools and 4-stroke-cycle gas engines

Preparation Before Teaching This Instructional Package

Before you begin teaching this instructional package, there are some things you should do. These will help ensure successful learning of SAFETY WITH SMALL ENGINE REPAIR by each student.

1. Preview all instructional materials provided in the Teacher's Guide, and view the audiovisual presentation.

   NOTE: The first four slides of the Safety presentation are of actual injuries on people. These photographs were taken at the Emergency Room of Parkland Hospital, Dallas. You may decide that your students would not become more safety conscious by viewing these pictures. Therefore, you may remove these slides from the presentation or if using a filmstrip, advance the presentation up to the picture of the ambulance and adjust the cassette accordingly.

2. Determine when and how these materials will be used in your class.

3. Determine whether there are any prerequisite skills which your students need before being taught this material; for example, is there vocabulary terms in the audiovisual presentation which the student should be familiar with before viewing.

4. Gather additional resources necessary to teach any prerequisite skills.

STUDENT GOAL AND OBJECTIVES

The student goal and objectives for this instructional package follow the Notes to the Instructor. Included with each objective are several suggestions for student activities, one of which is provided in this guide. These are to assist you in writing each student's Individual Instructional Plan (IIP).

1. Discuss the goal and objectives with each student so that it is clearly understood what is expected of the student.

2. Add any additional objectives such as prerequisite skills which need to be learned by the student.

TRANSPARENCY MASTERS

Numerous 8½" x 10" illustrations have been provided in the Teacher's Guide to be used in a variety of ways:

1. As transparencies. If so, make an acetate of each illustration so that it may be projected onto a screen, using an overhead projector.

2. Copied and used as hand-outs to students.

3. As materials to be used in Student Activities.

4. As display material for a bulletin board.

PROCEDURES FOR SHOWING THE AUDIOVISUAL PRESENTATION

1. Plan a short but relevant introduction to tell students what to look for in the presentation.

2. If including the four pictures of actual injuries in the presentation, prepare the students for them by explaining that they will see four photographs of real injuries that may have resulted from carelessness around engines. These photographs were taken of the person's injury at the Emergency Room of Parkland Hospital in Dallas.

3. Allow enough time to show the presentation and for student discussion.

4. Show the audiovisual presentation to the students in a group or individual setting.

5. Ask students to highlight the major points of the presentation using the Student Activity Sheets provided in this guide. Show the presentation a second time if necessary.

6. Stress the importance of safety in the shop.

STUDENT ACTIVITIES

Student Activity Sheets are provided to help reinforce the information presented on the audiovisual and to give your students an opportunity to become more safety conscious. Directions for administering this activity is flexible in that it may serve as out outline for a group discussion or students may answer the questions individually and in writing.

EVALUATION CHART

It is encouraged that a grading system not be based on the written activities provided for the student, but rather on individual physical performance of safety practices by each student. An evaluation chart is provided in this Teacher's Guide for this purpose. The chart is intended for use as a grading instrument and as a motivational aid by rating personal progress toward demonstrating safety with small engine repair.

1. Discuss with the students how they will be evaluated, based on individual performance shown by the evaluation chart.

2. See the section titled "Evaluation Chart" for specific instructions on how to use the evaluation chart.

STUDENT GOAL AND OBJECTIVES

The following are provided to assist in the development and writing of each student's Individual Instructional Plan (IIP). Built into these objectives is the use of the evaluation chart found in this guide. You will want to use this chart for monitoring each student's progress toward these objectives. Criterion for competency or the rating that a student must achieve for a predetermined length of time is suggested as a rating of 3 for three consecutive days on the evaluation chart. See "Evaluation Chart" for further information.

LONG-TERM GOAL: After completing Safety With Small Engine Repair, the student will be able to define safety, recognize safety practices in the small engine repair shop, and demonstrate safety while learning the repair jobs on small gasoline engines.

SHORT-TERM OBJECTIVES	ACTIVITIES AND MATERIALS
1. Given information about safety with small gas engine repair, the student will describe what the word safety means.	1. Watch the audiovisual presentation, "Safety With Small Engine Repair," and participate in class discussion on the meaning of safety. 2. Review slides 7-12 and answer the questions concerning the description of safety in Student Activity 1.
2. Given information about safety rules with small engine repair, the student will be able to recognize unsafe and safe practices associated with small engine repair.	1. Watch the audiovisual presentation, "Safety With Small Engine Repair," and participate in class discussion on the unsafe and safe practices covered in the presentation. 2. Observe the teacher demonstrating unsafe practices and the consequences of such practices, such as: using the wrong tool on engine parts, using the wrong size tool on engine parts, demonstrating how easily gasoline catches on fire, horseplaying in the shop, etc. 3. Review slides 13-56 and answer the questions in Activity 1 concerning unsafe and safe practices associated with small engine repair.

	4. Visit a small engine repair shop or invite owners of shops to your class to talk about personal experiences they have had with safe and unsafe practices while working with small gasoline engines. 5. In your class, keep a journal of unsafe practices and accidents that happen in your shop. Record how it could have been prevented. (At the end of the school year, this journal can be given to the next year's class for their safety study.
3. Given information about safety rules with small engine repair, the student will be able to demonstrate safe practices while learning the repair jobs of small gas engines.	1. While learning repair jobs on the small gas engine, reviews the good work habits and safety information that is presented for each engine system in the SMALL ENGINE REPAIR SERIES. 2. Practices all safety rules while in the shop and working on engines. 3. Using the evaluation chart provided in the Teacher's Guide, rate the student progress for two consecutive weeks or until a rating of 3 for each safety rule is achieved for three consecutive days.

SAFETY TO FOLLOW

YES

NO

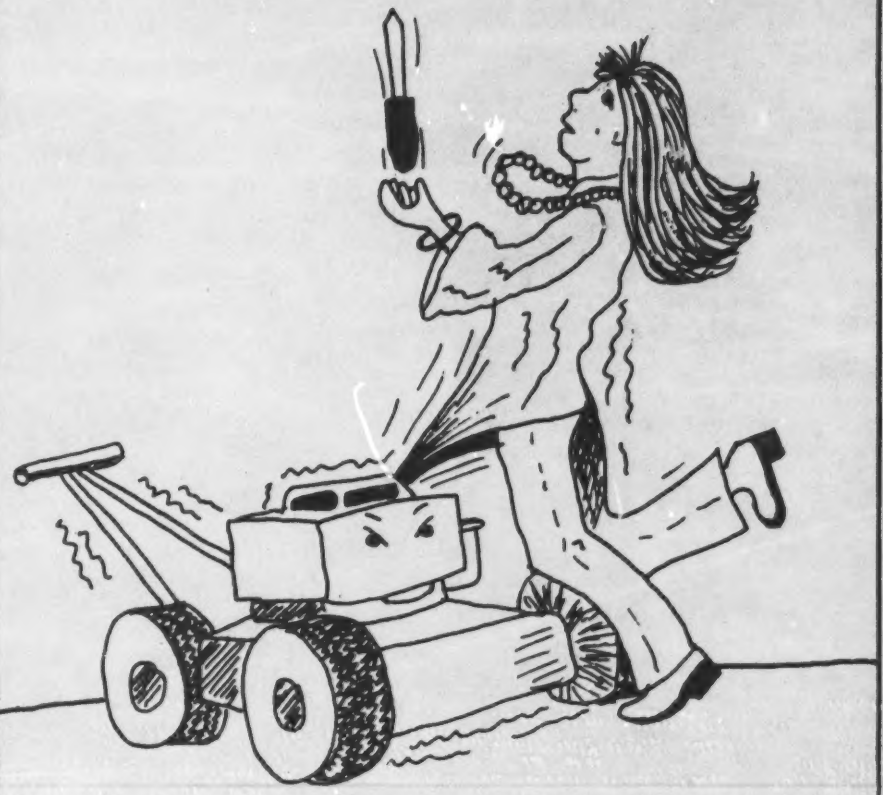
TM-1

Have a safe attitude

SAFETY TO FOLLOW

YES

NO



TM-2

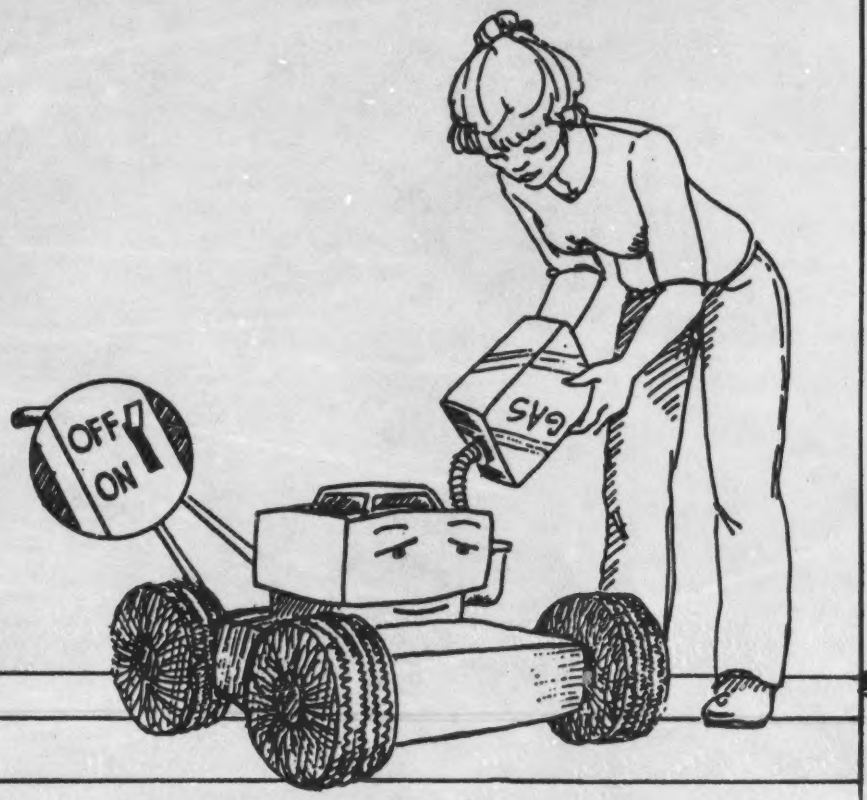
16

Wear protective clothing and not loose, baggy clothes and dangling jewelry.

9

SAFETY TO FOLLOW

YES



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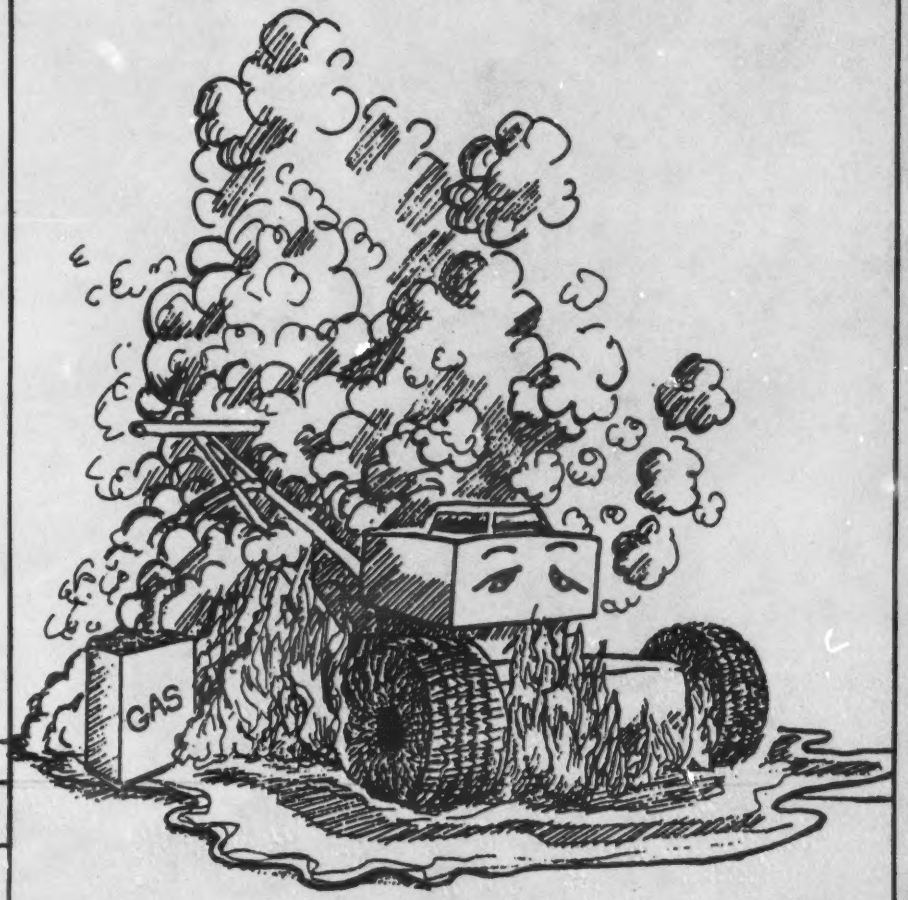


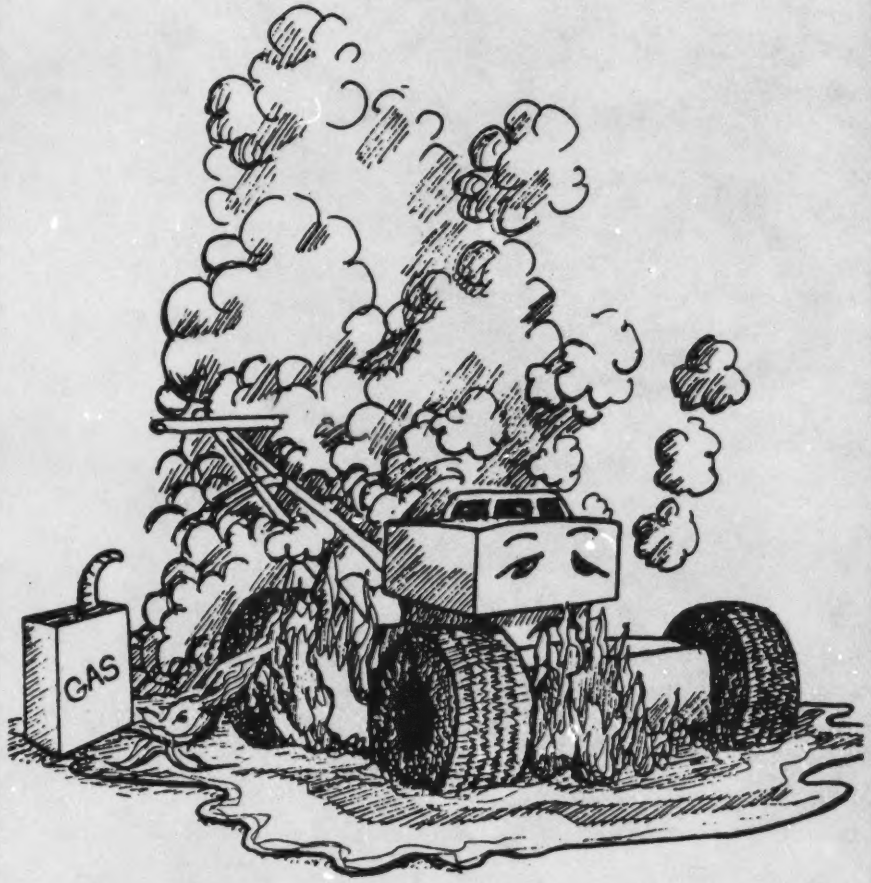
When your engine runs out of gas, always stop the engine and let it cool before putting more gas in the fuel tank.

TM-3

SAFETY TO FOLLOW

YES

NO



WIPE AWAY SPILLED GASOLINE WITH A SHOP TOWEL

TM-4

19

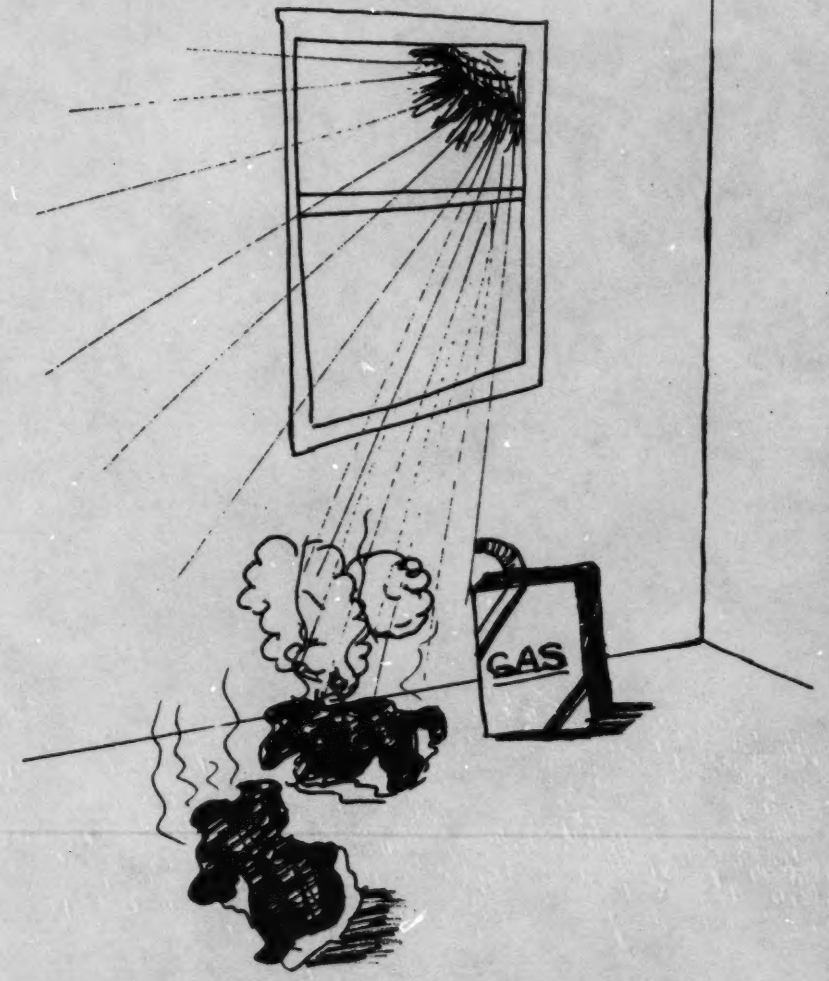
20

13

SAFETY TO FOLLOW

YES

NO



Put oily shop towels in an approved metal can and store gasoline in a cool dry place.

TM-5

SAFETY TO FOLLOW

YES

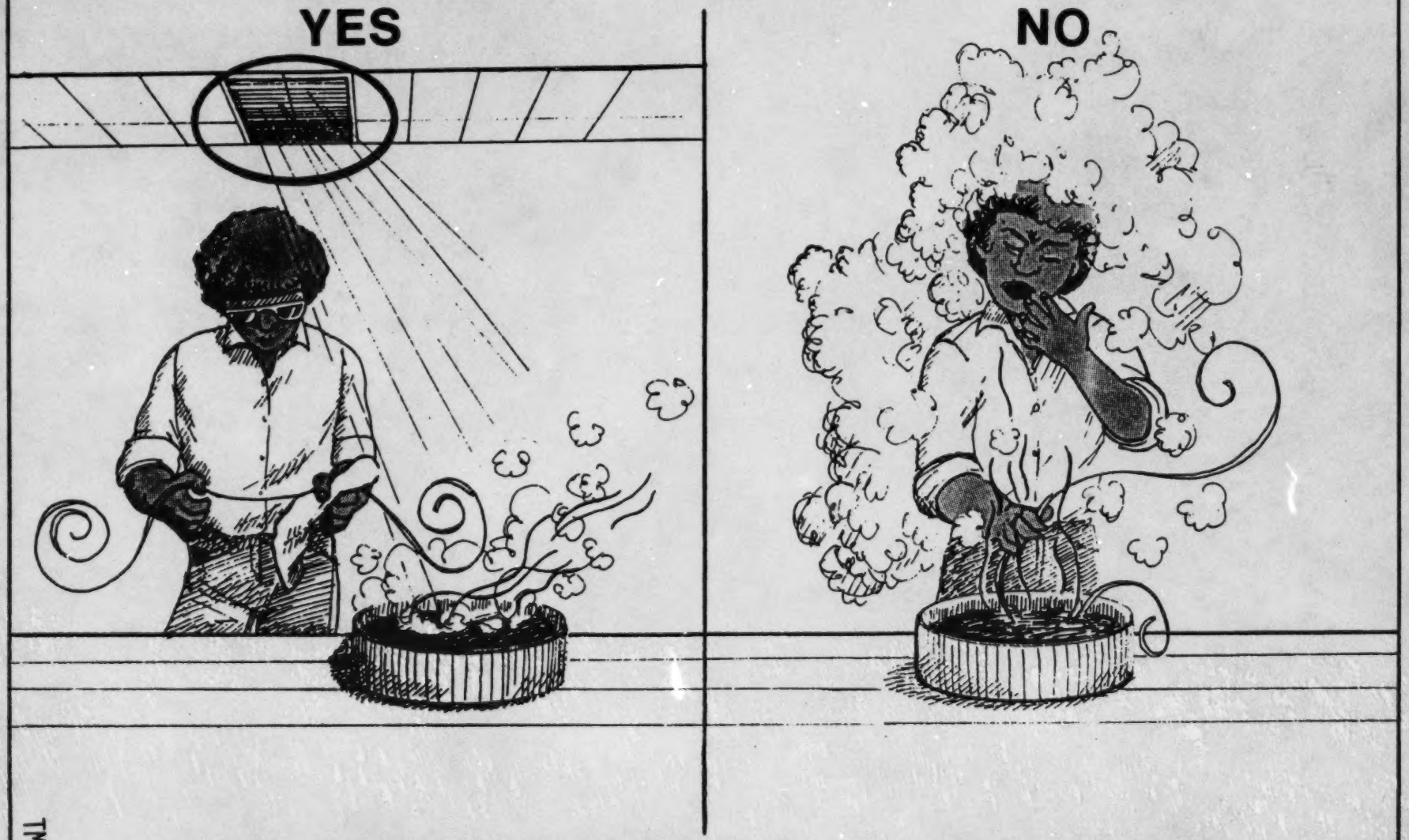
NO

TM-6

USE SOAP AND WATER TO CLEAN ENGINE PARTS, NOT GASOLINE.

17

SAFETY TO FOLLOW



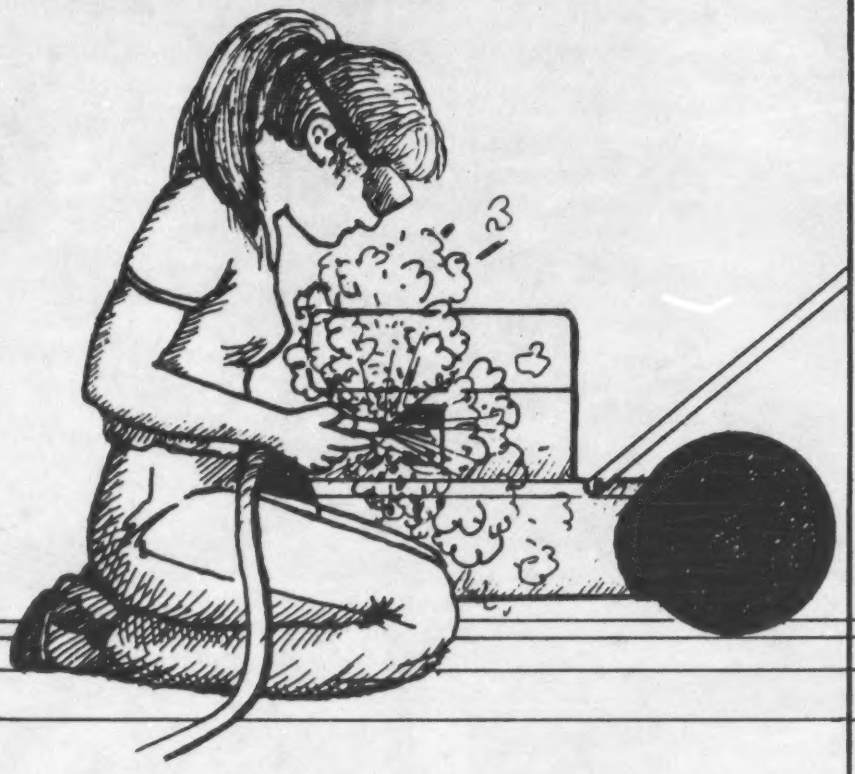
TM-7

WHEN USING CLEANING FLUID, OPEN A WINDOW OR TURN ON THE AIR IN THE SHOP.

19

SAFETY TO FOLLOW

YES



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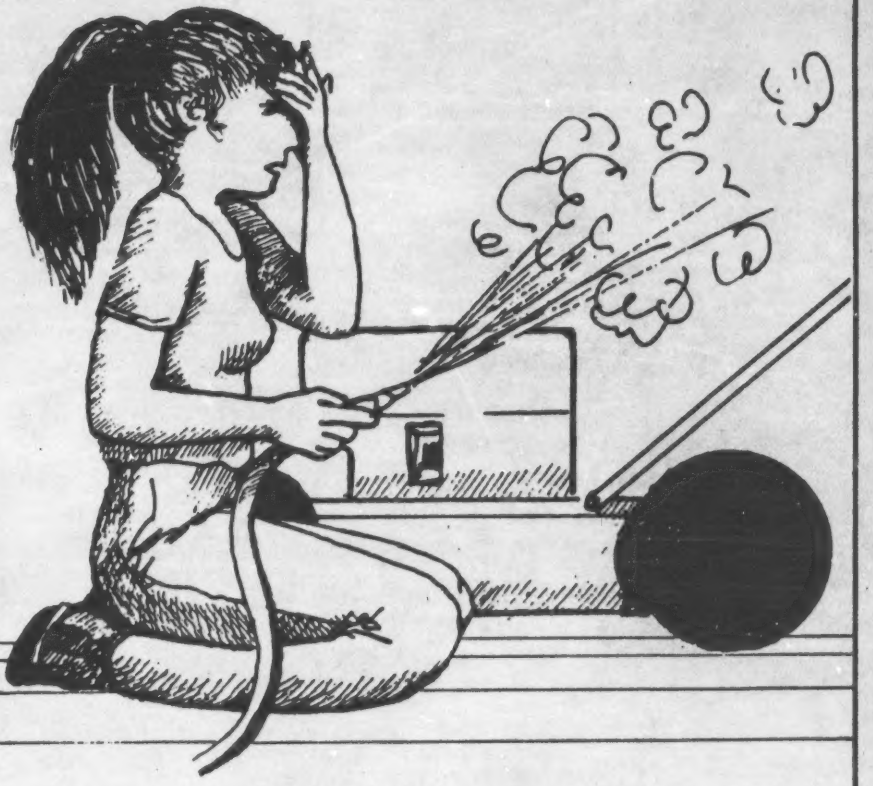


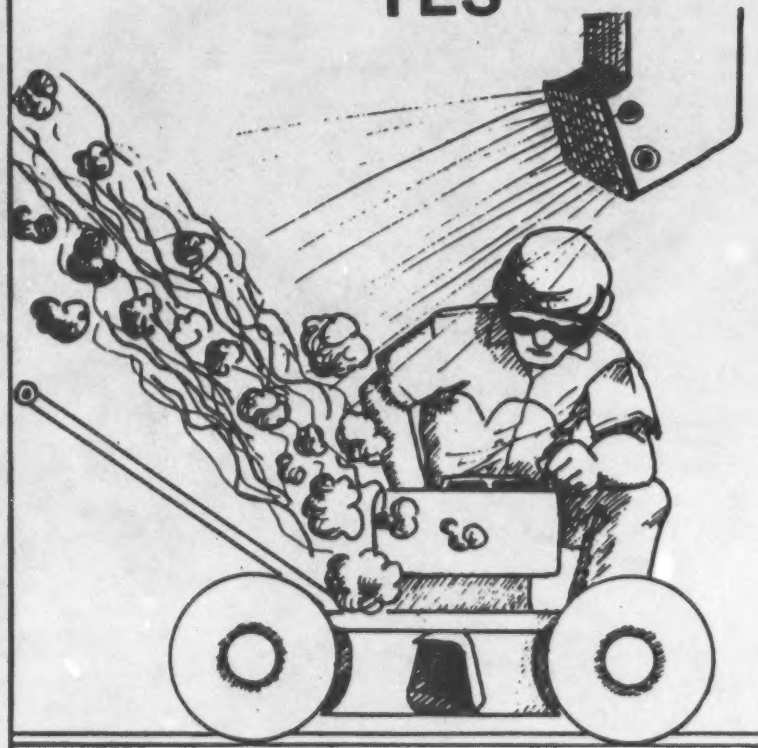
WHEN USING AN AIR HOSE, WEAR YOUR SAFETY GLASSES.

TM-8

21

SAFETY TO FOLLOW

YES



NO

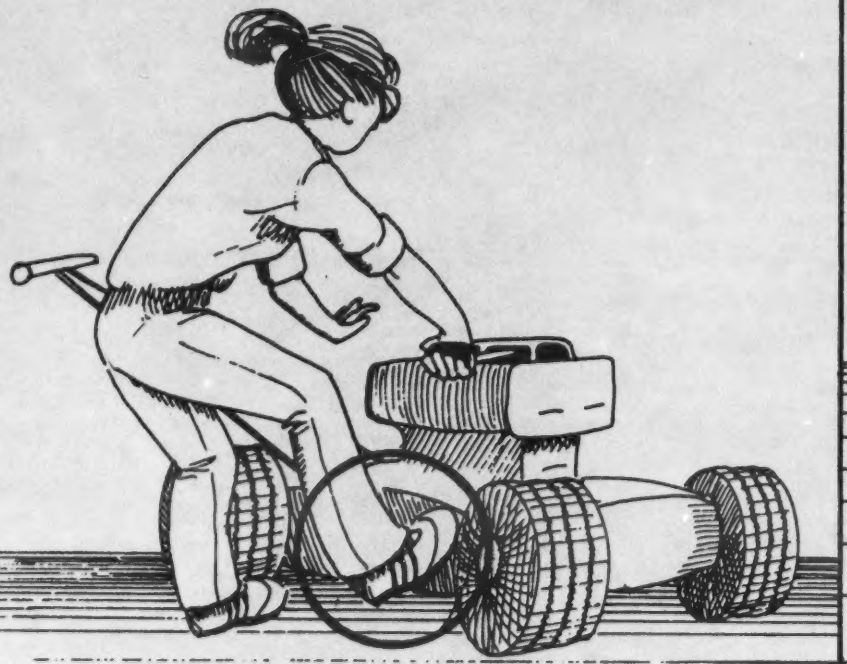
TM-9

BEFORE STARTING THE ENGINE, MOVE IT OUTSIDE OR TO A WELL VENTILATED AREA.

23

SAFETY TO FOLLOW

YES



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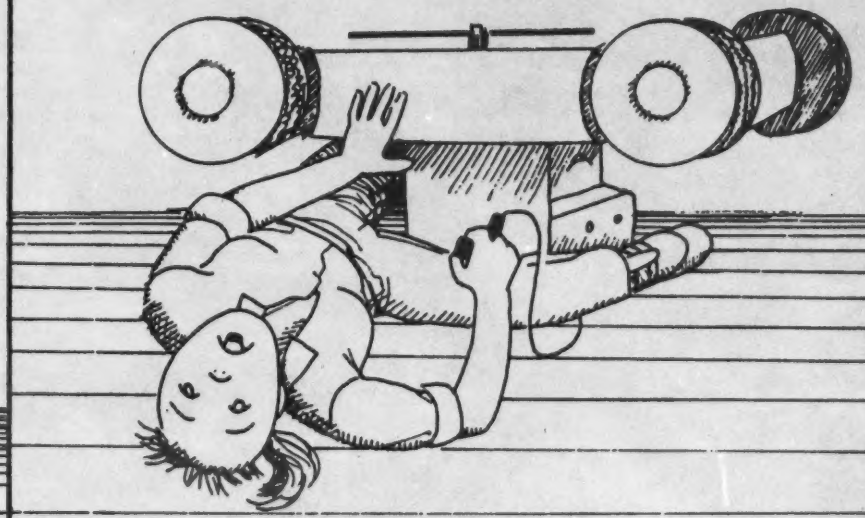
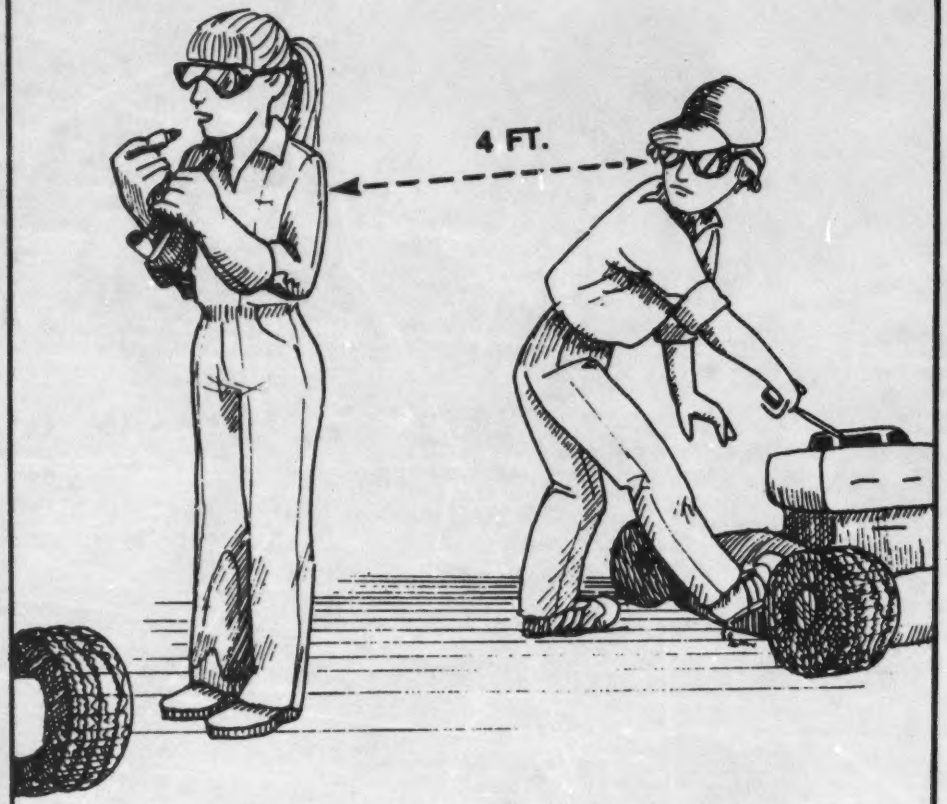


PUT ONE FOOT ON LAWNMOWER WHEN CRANKING THE ENGINE.

TM-10

SAFETY TO FOLLOW

YES



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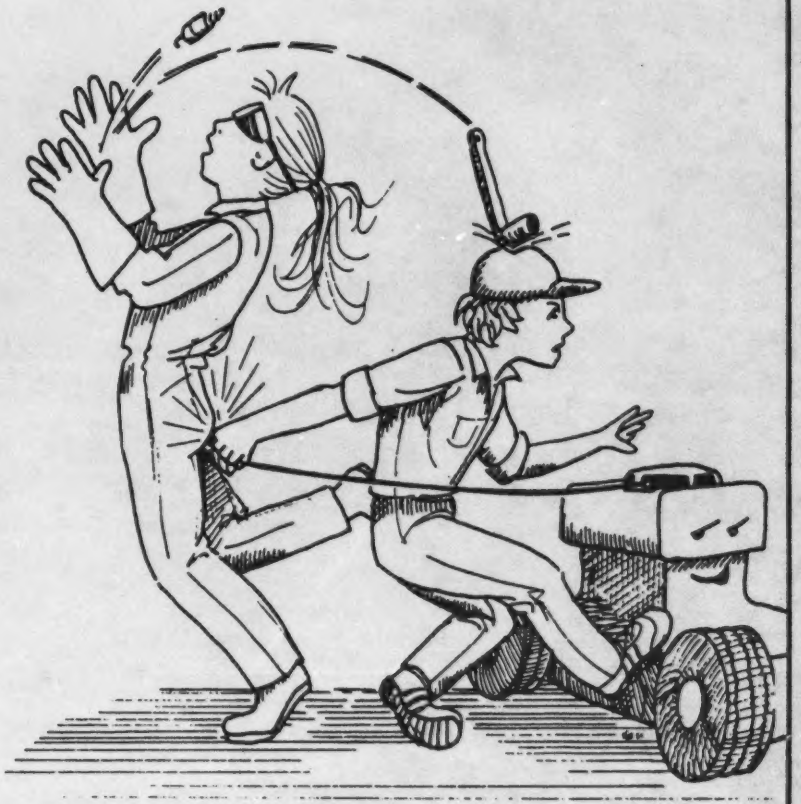
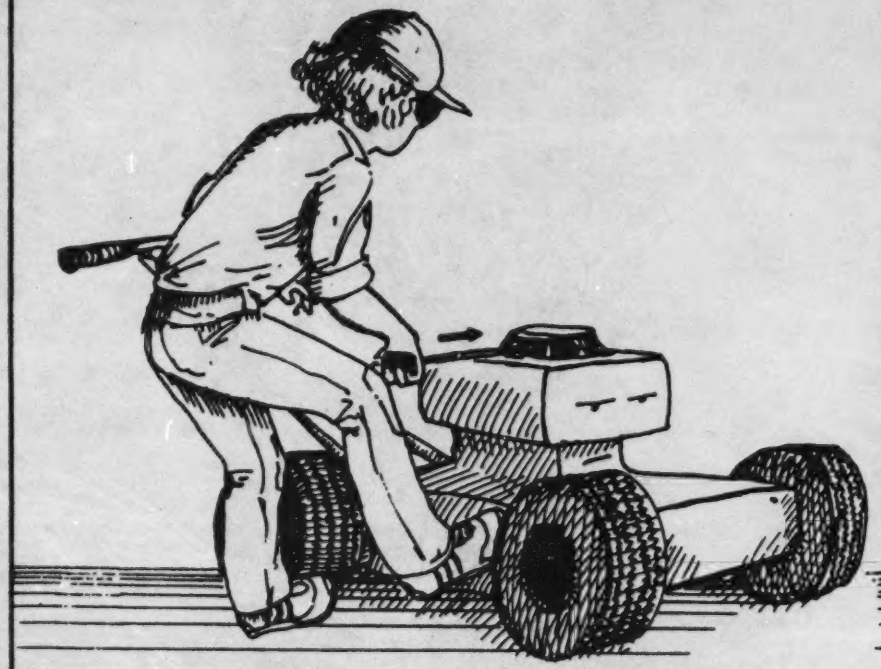


LOOK BEHIND YOU BEFORE PULLING THE STARTER ROPE.

TM-11

SAFETY TO FOLLOW

YES



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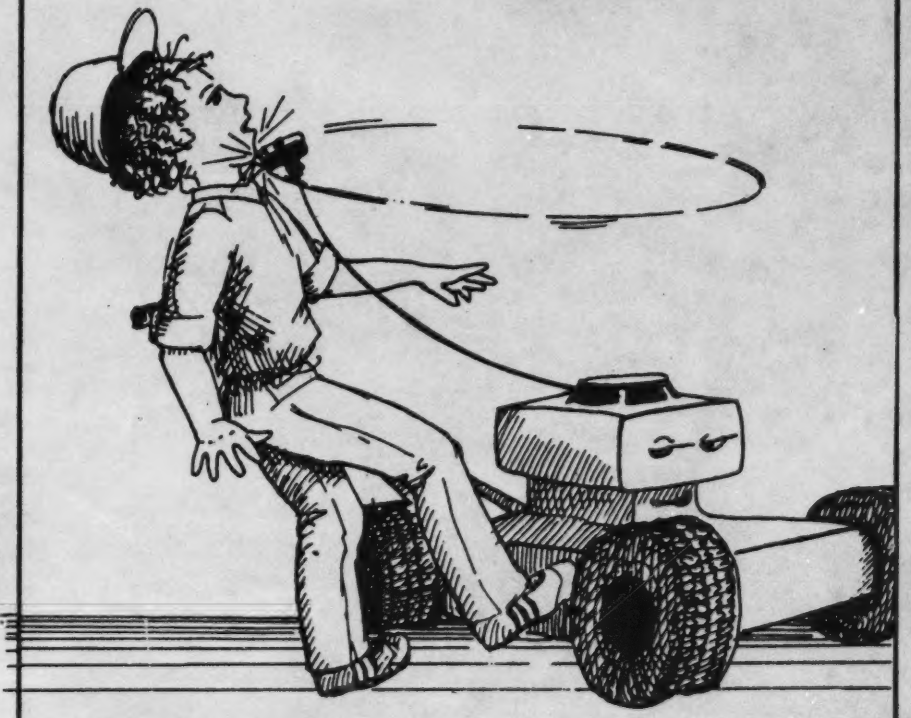
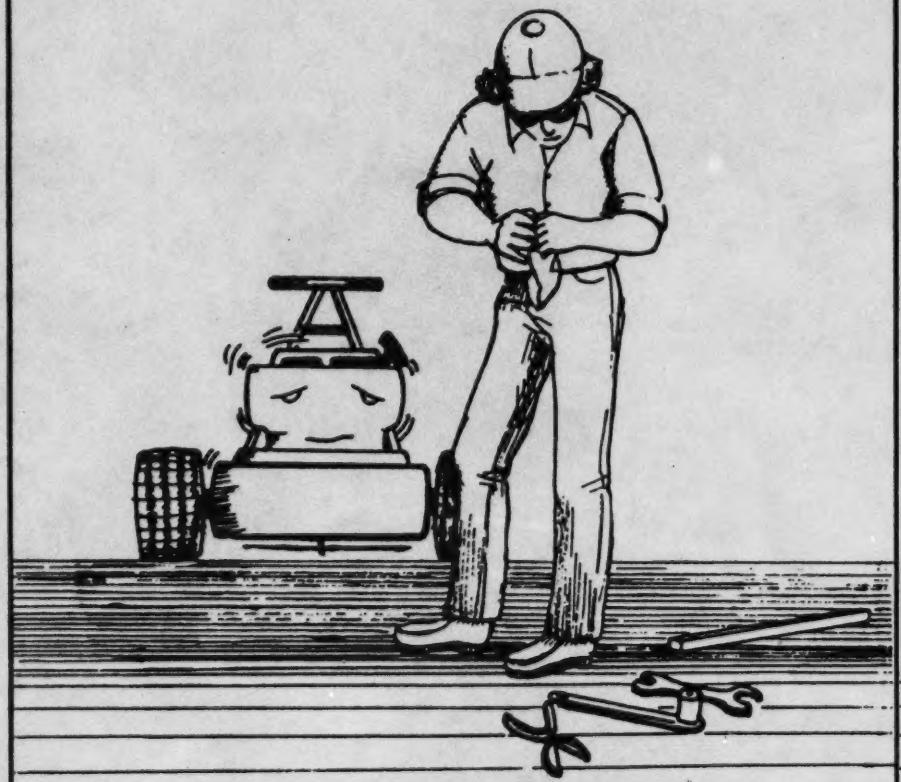


HOLD ON TO ROPE WHEN IT IS REWINDING INTO PULLEY.

SAFETY TO FOLLOW

YES



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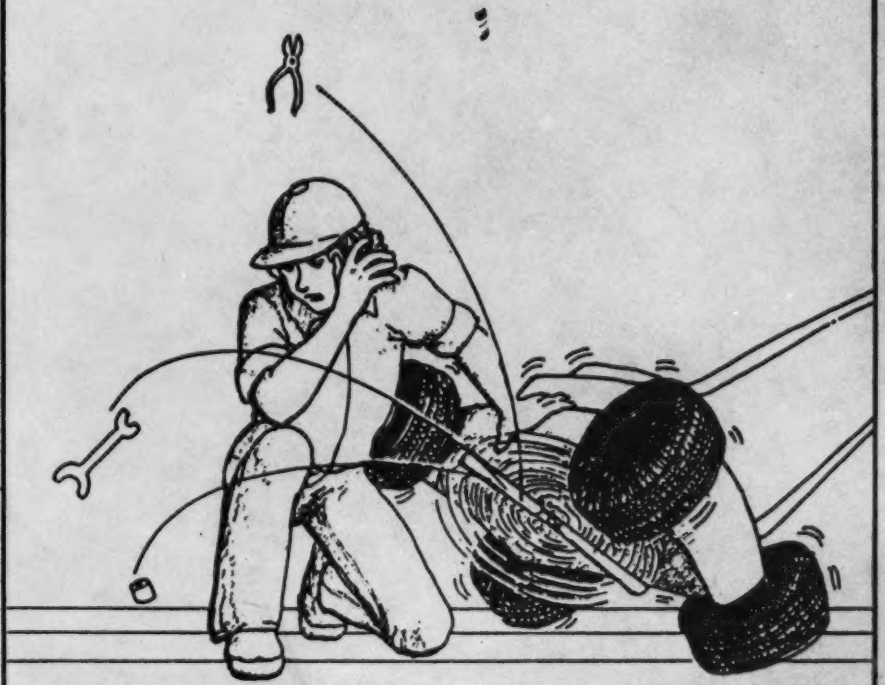


TM-13

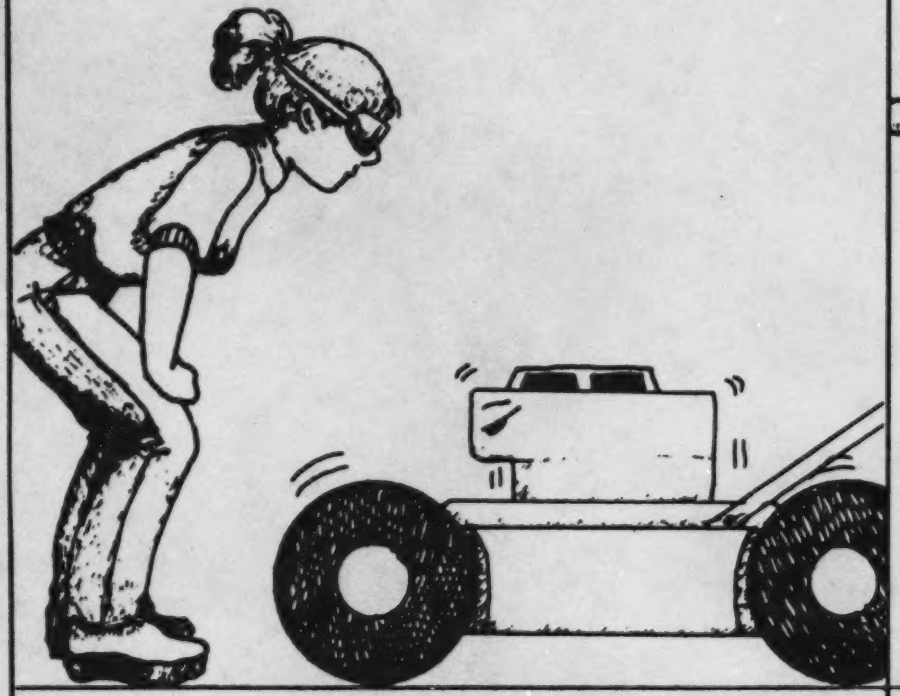
37

WHILE AN ENGINE IS RUNNING, NEVER LIFT UP THE LAWNMOWER, AND KEEP TOOLS, HANDS, AND FEET AWAY FROM THE LAWNMOWER BLADES.

38

SAFETY TO FOLLOW

YES



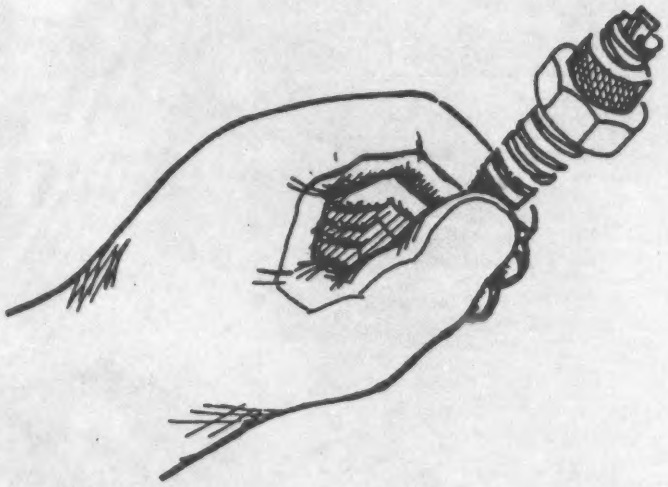
NO

TM-14

39 ALWAYS WATCH A RUNNING ENGINE. DO NOT LEAVE IT RUNNING UNATTENDED. 40

SAFETY TO FOLLOW

YES



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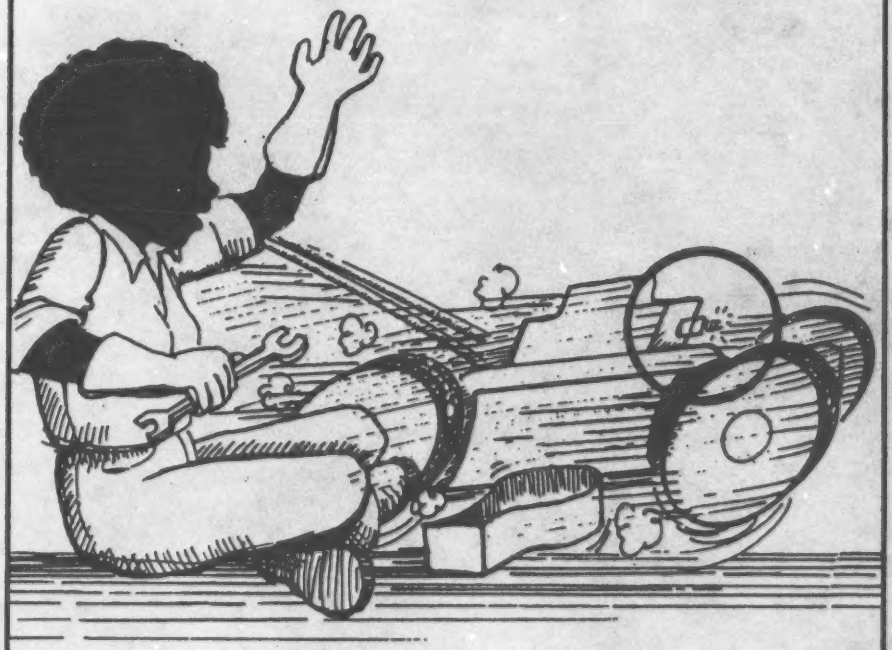

41

42

ALWAYS REMOVE THE SPARK PLUG BEFORE WORKING ON AN ENGINE.

SAFETY WITH SMALL ENGINE REPAIR

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
1	(Start Recorder)	
2	SAFETY WITH SMALL ENGINE REPAIR (Title Slide)	
3	Photo of burn	
4	Photo of burn	
5	Photo of laceration	
6	Photo of laceration	
7	Two attendants lifting an accident victim lying on a stretcher into an ambulance. Victim's leg is bandaged and blood is showing through bandages.	(Ambulance siren up and lasting for 5-10 seconds.--Ambulance siren under.) Accidents--they seem to happen all the time. But most accidents don't <u>just</u> happen; they are usually caused by the careless actions of people--people like <u>you</u> and like <u>me</u>. We don't often mean to cause accidents, we just forget to be as careful as we should.
8	Instructor next to blackboard with the word SAFETY written on it. Student standing nearby.	Preventing an accident from happening is what safety is all about. What does the word "safety" mean to you?
9	Student picking up a banana peel on floor or sidewalk.	Does safety mean picking up off the floor things that someone could slip on? . . .

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
10	Car stopped at stop sign at a street corner.	Or stopping your car at every "Stop" sign that you come to? . . .
11	Student wearing safety glasses in the shop class.	Or does it mean wearing safety glasses when you are in the shop class?
12	Cartoon of frames 5, 6, and 7 with the words "Safety is a way of life" printed across the bottom.	If you think that safety is all of these things, then you are right. Safety is a way of life. It is something that we all should learn about and practice everyday, because it could save your life--or mine--someday.
13	View of small engine repair shop with students working at their stations.	(Sound of activity and engines in shop.) So, let's see what some of the safety rules are in a small engine repair shop. Safety on the job is important and you, as a future small engine mechanic, should learn the rules now. Yes, we all want to do quality work, but safety must come first.
14	Student dressed in work overalls and safety glasses.	Sometimes, safety is as simple as having a safe attitude and wearing protective clothes. Yes, that's right; the clothes you wear in the shop are that important.
15	Safety glasses hanging on a rack.	For example, safety glasses will protect your eyes from flying metal objects, dust, dirt, and sparks, but the safety glasses won't do any good hanging on a rack, . . .
16	Student wearing safety glasses and using compressed air to blow out engine cylinder.	they must be worn whenever there's a chance of getting something in your eyes. After all, your eyes are the only pair you'll ever have.
17	Female student with baggy blouse sleeves and a dangling necklace. Student is working on riding lawnmower.	If your sleeves are loose and baggy, or you are wearing jewelry that is dangling, it could easily get caught in the moving engine parts.
18	Female student rolling up baggy sleeve; long necklace has been removed.	So remove your jewelry and roll up those sleeves before starting any work on an engine.
19	SAFE ATTITUDE	Earlier, I mentioned something about having a safe attitude. Let's talk about what it means to have a safe attitude.

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
20	Student who is distracted from his work because he is watching the instructor and another student.	Most importantly, it means paying attention to your work--and not getting distracted.
21	Students standing around another student who has fallen over a lawnmower and hurt himself. Hurt student is sitting on floor and holding head which is bleeding.	(Sound of students who are horseplaying in shop and then a loud crash.) A safe attitude also means no running and horseplaying in the shop, because there are too many dangerous tools and heavy engines that could hurt you or someone else.
22	Cartoon of female student reading operator's manual and male student working with tools. Small engine and tools are lying around.	Having a safe attitude also means that you understand and are always on guard for the hazards of your job. This means that you not only know how to use tools and equipment safely, but that you also practice using them safely every day and that you don't take any dangerous chances.
23	SAFETY WITH SMALL ENGINE MATERIALS	So let's see what are some of the safe ways to use small engine repair supplies and materials.
24	Group shot of gasoline can, carburetor, cleaner, shop towels, approved storage container, socket set, ballpeen hammer, flywheel puller, screwdrivers.	In your work, you will use many different kinds of small handtools and materials. Here are some of them. You may already know how to use most of them, but let's take a look at the safe way to handle some of these materials.
25	Student pouring gasoline from a coffee can into fuel tank on lawnmower. Gasoline is spilt on engine.	Probably the most dangerous material that you will use in your work is gasoline. Gasoline will easily catch on fire . . . and so it must be handled very carefully.
26	Student pouring gasoline from an approved gasoline safety can.	Some of the safety rules to follow when using gasoline is to always store it in an approved safety can.

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
27	Cartoon of student who has put gasoline into a hot engine and it has exploded.	When putting gasoline into an engine, remember to turn off the engine and let it cool down, because putting gasoline into a hot engine could cause the gasoline to explode into fire.
28	Student wiping away gasoline on the shop floor near a lawnmower.	If for any reason gasoline is spilled onto an engine or the shop floor, don't use water to wash it away because water will only spread out the spilled gasoline. Instead, wipe up the gasoline with a shop towel.
29	Student (with puzzled look on face) holding dirty shop towel.	And--Uh-oh--what do you do with those shop towels that were used to wipe away the spilt gasoline? If they are left lying around, they, too, could very easily catch on fire.
30	Hand placing dirty shop towel in approved storage container.	So--please remember to store them in an approved storage container, too.
31	Can of carburetor cleaner	Another dangerous material that you will use is carburetor cleaner. It is used to clean some of the engine parts like the carburetor, starter rewind spring, and piston.
32	Cartoon of student coughing while using carburetor cleaner to clean rewind starter spring.	(Sound of person coughing.) Although it won't catch on fire, it could be harmful to your eyes and skin, and the fumes could make you choke.
33	Cartoon of student cleaning rewind spring with carburetor cleaner, and air vent is blowing fumes away.	So before using carburetor cleaner, put on your safety glasses and open a window or turn on the air in the shop so that the fumes will blow away from your face. And try not to get the carburetor cleaner on your skin.
34	SAFETY WITH HAND TOOLS	Now let's see what some of the safe ways are to use small hand tools.
35	Student blowing compressed air on hair that is standing up.	Compressed air--it's one of the most useful tools in the shop, but it's not a play-thing to squirt at your buddy or cool yourself.
36	Air hose blowing out contact points.	Compressed air or the air hose should only be used for removing dirt and dust from the engine parts . . .

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
37	Side view of student wearing safety glasses while using compressed air on an engine.	and, oh, yes, don't forget to wear those safety glasses when using compressed air because the blowing dirt and dust could easily get in your eyes.
38	Hammer banging on lawnmower starter clutch.	(Sound of hammer banging on starter clutch.) A hammer would look like a starter clutch wrench if it were meant to be used as one. Always use the right tool of the correct size for the job. Otherwise, using the wrong tool could very easily break or damage an engine part.
39	Clutch wrench and flywheel holder on starter clutch and flywheel.	So, use a clutch wrench and flywheel holder for removing the starter clutch instead of a hammer, . . .
40	Spark plug socket on spark plug	and use a spark plug socket on the spark plug, instead of pliers, . . .
41	Carburetor jet screwdriver removing main fuel nozzle in carburetor.	and use the right size screwdriver on carburetor parts, so the parts will not be bent or damaged.
42	Cartoon of student with screwdriver bending over lawnmower.	Although these are just a few examples of using the correct tool, there are many others. The important thing to remember is that using tools safely means using the right tool and the right size tool for the job, so that you or the engine part is not hurt.
43	SAFETY WITH THE SMALL GAS ENGINE	Now, let's talk about safety with the engine.
44	Cartoon of animated lawnmower with a mean look on face.	The small gasoline engine can be a very useful or a very dangerous piece of equipment if it is not handled safely. In addition to a good attitude about safety, you should always follow certain safety precautions whenever you are starting or repairing an engine.
45	Student reading operator's manual.	Perhaps the most important safety rule to practice around small gasoline engines is to always know how to stop the engine before you start it or repair it. You can learn how to stop an engine by reading the operator's manual or the information that may be stamped on the engine shroud.

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
46	Cartoon of student coughing caused by fumes from running lawnmower.	All small gasoline engines when they are running give off poisonous fumes called carbon monoxide. If you breathe too much carbon monoxide, it could make you very sick and even kill you.
47	Student moving lawnmower outside.	So when starting any gasoline engine, remember to either move the engine outside or make sure that your shop area is well-ventilated. It is important that the air around you mix with the carbon monoxide fumes so that they will not be harmful to you.
48	Student with a cut foot sitting on floor near running lawnmower. Student is in pain and holding foot; blood is showing through sock and hand.	(Sound of motor starting, then a loud yell.) This is an example of an injury that could easily happen to you if the engine is started without first following some other safety rules. This accident happened because the person didn't first check under the engine for loose tools or other objects that could fly up from the moving blades, causing an injury.
49	Student bracing foot on lawnmower while pulling the starter rope.	Here are some other important safety rules to follow when cranking an engine: (1) always brace yourself against the engine so that when the engine starts, it doesn't get away from your control; . . .
50	Student holding onto T-handle, arrow on rope pointing toward engine indicating that rope is rewinding.	(2) After pulling out the starter rope, hold onto the rope while it is rewinding into the engine. If you let go of the rope, it might hurt you or the rope could be damaged.
51	Cartoon of animated engine chasing student.	(Sound of motor for 10 sec.) Now that you have safely started your engine, stay with it until you turn it off. Many accidents have occurred because a mower with a running engine was left alone and unattended. Remember--engines don't know what safety is all about.
52	Cartoon of mechanic sitting on floor with tools. Lawnmower is running away. Spark plug is emphasized.	As you learn about the repair jobs on small gasoline engines, you will also learn that the spark plug is the key that gives the engine life. Without a spark plug, the engine cannot possibly start.
53	Hand removing spark plug from engine.	So before doing any work on an engine, remove the spark plug wire and spark plug so that an injury will not occur from the engine accidentally starting.

SLIDE NO.	SLIDE DESCRIPTION	NARRATIVE
54	SAFETY COMES FIRST	This completes the presentation on Safety With Small Engine Repair. There are other safety rules that we could have mentioned when working with small gasoline engines, but the most important thing to remember as a small engine mechanic is to maintain that "safe attitude" that we first talked about. Practicing safety in your shop and then on your job will help ensure (Music under) your becoming a valuable small engine mechanic.
55	Credit slide to GMR class at Greenville Jr. High School	(Music up)
56	Credit slide to OCL	(Music out)

55

56

STUDENT ACTIVITY 1

WHAT IS SAFETY?

(To Be Used With the Audiovisual Presentation)

A. DIRECTIONS: LOOK AT THE PRESENTATION SLIDES 7-12. TELL YOUR TEACHER OR WRITE DOWN WHAT THE WORD "SAFETY" MEANS TO YOU.

B. DIRECTIONS: PLACE A "✓" IN FRONT OF EACH CORRECT SENTENCE.

_____ 1. SAFETY IS PREVENTING AN ACCIDENT FROM HAPPENING.

_____ 2. SAFETY MEANS PICKING UP A SKATEBOARD THAT SOMEONE COULD SLIP ON.

_____ 3. SAFETY IS WHEN ACCIDENTS HAPPEN ALL THE TIME.

_____ 4. EVERYONE SHOULD PRACTICE SAFETY EVERYDAY.

_____ 5. SAFETY MEANS WEARING SAFETY GLASSES IN THE SHOP CLASS.

_____ 6. SAFETY MEANS TO HORSEPLAY IN THE SHOP.

_____ 7. FOLLOWING THE SAFETY RULES COULD SAVE YOUR LIFE.

_____ 8. FOLLOWING SAFETY RULES SHOULD BE A PART OF EVERYONE'S LIFE.

STUDENT ACTIVITY 2

A SAFE ATTITUDE

(To Be Used With the Audiovisual Presentation)

A. DIRECTIONS: LOOK AT THE PRESENTATION SLIDES 13-22. THE PRESENTATION SAYS THAT YOU SHOULD HAVE A "SAFE ATTITUDE" WHEN YOU ARE IN THE SMALL ENGINE REPAIR SHOP. A "SAFE ATTITUDE" MEANS BEHAVING SAFELY AND HAVING GOOD WORK HABITS. GIVE 5 EXAMPLES OF HAVING A SAFE ATTITUDE.

1. _____

2. _____

3. _____

4. _____

5. _____

B. DIRECTIONS: PLACE A "✓" IN FRONT OF EACH CORRECT SENTENCE.

_____ 1. AS A SMALL ENGINE MECHANIC YOU REALLY DON'T HAVE TO PAY MUCH ATTENTION TO SAFETY.

_____ 2. SOMETIMES SAFETY IS AS SIMPLE AS HAVING A SAFE ATTITUDE.

_____ 3. STUDENTS SHOULD HORSEPLAY IN THE SHOP EVEN THOUGH THERE IS DANGEROUS TOOLS THAT COULD HURT YOU.

_____ 4. PART OF SAFETY MEANS WEARING PROTECTIVE CLOTHES.

_____ 5. A SAFE ATTITUDE MEANS PAYING ATTENTION TO YOUR WORK AND NOT GETTING DISTRACTED.

_____ 6. SAFETY GLASSES SHOULD BE LEFT HANGING ON A RACK IN THE TOOL ROOM AND NOT BE WORN.

_____ 7. A SAFE ATTITUDE MEANS THAT YOU IGNORE YOUR WORK AND TRY TO LISTEN TO WHAT ANOTHER STUDENT IS SAYING TO THE INSTRUCTOR.

_____ 8. A SAFE ATTITUDE MEANS THAT YOU KNOW HOW TO USE TOOLS AND EQUIPMENT AND YOU PRACTICE USING THEM SAFELY EVERYDAY.

_____ 9. IT IS ALRIGHT TO WEAR LOOSE AND BAGGY SLEEVES AND DANGLING JEWELRY WHEN YOU ARE REPAIRING AN ENGINE.

_____10. A SAFE ATTITUDE MEANS THAT YOU DO WHAT YOU WANT TO WITH ENGINES AND TOOLS AND THAT YOU DON'T NEED TO BE ON GUARD FOR ACCIDENTS.

STUDENT ACTIVITY 3

SAFETY WITH SMALL ENGINE MATERIALS

(To Be Used With the Audiovisual Presentation)

A. DIRECTIONS: LOOK AT THE PRESENTATION SLIDES 23-33. THIS PART OF THE PRESENTATION TALKS ABOUT SAFETY IN HANDLING MATERIALS SUCH AS GASOLINE, OILY SHOP TOWELS, AND CARBURETOR CLEANER. TELL YOUR TEACHER OR WRITE DOWN THE ANSWERS TO THE FOLLOWING QUESTIONS.

1. GASOLINE WILL EASILY CATCH ON FIRE. HOW SHOULD GASOLINE BE STORED?

2. WHAT 2 THINGS SHOULD YOU DO BEFORE PUTTING GASOLINE INTO AN ENGINE THAT IS RUNNING?

   A. _____

   B. _____

3. IF GASOLINE IS SPILLED ON THE SHOP FLOOR, HOW SHOULD IT BE CLEANED UP?

4. WHAT SHOULD YOU DO WITH OILY SHOP TOWELS?

B. DIRECTIONS: PLACE A "✓" IN FRONT OF THE 3 SAFETY RULES TO BE FOLLOWED WHEN USING CARBURETOR CLEANER.

_____ 1. WEAR YOUR SAFETY GLASSES.

_____ 2. DO NOT WEAR GLOVES WHEN USING CARBURETOR CLEANER.

_____ 3. OPEN A WINDOW OR TURN ON THE AIR IN THE SHOP.

_____ 4. TRY NOT TO GET CARBURETOR CLEANER ON YOUR SKIN.

STUDENT ACTIVITY 4

SAFETY WITH HAND TOOLS

(To Be Used With the Audiovisual Presentation)

A. DIRECTIONS: LOOK AT THE PRESENTATION SLIDES 34-42. THIS PART OF THE PRESENTATION TALKS ABOUT SAFETY WITH SMALL HAND TOOLS. CIRCLE "T" IF THE STATEMENT IS TRUE AND "F" IF IT IS FALSE.

T F 1. COMPRESSED AIR CAN BE USED TO COOL YOURSELF.

T F 2. YOU SHOULD WEAR YOUR SAFETY GLASSES WHEN USING THE AIR HOSE.

T F 3. USE THE RIGHT TOOL OF THE CORRECT SIZE FOR THE JOB.

T F 4. IT IS OKAY TO USE A HAMMER FOR A FLYWHEEL PULLER.

T F 5. USING THE WRONG TOOL COULD EASILY BREAK AN ENGINE PART.

T F 6. USE PLIERS TO REMOVE THE SPARK PLUG IN AN ENGINE.

T F 7. COMPRESSED AIR IS NOT A PLAYTHING.

T F 8. THE ONLY TOOL THAT SHOULD BE USED TO REMOVE THE SPARK PLUG IS A SPARK PLUG SOCKET.

B. DIRECTIONS: FROM THE LIST AT THE RIGHT, FIND THE CORRECT TOOL TO USE TO AVOID DAMAGE WHEN REMOVING EACH OF THE ENGINE PARTS LISTED AT THE LEFT. PUT THE CORRECT LETTER IN EACH OF THE BLANKS.

_____	1. SPARK PLUG	A.	PLIERS
_____	2. FLYWHEEL	B.	STARTER CLUTCH WRENCH
_____	3. MAIN FUEL NOZZLE IN CARBURETOR	C.	PHILLIPS SCREWDRIVER
		D.	SPARK PLUG SOCKET
_____	4. BOLTS ON ENGINE SHROUD	E.	RIGHT SIZE SOCKET AND WRENCH
_____	5. STARTER CLUTCH	F.	CARBURETOR JET SCREWDRIVER
		G.	HAMMER
		H.	FLYWHEEL PULLER

STUDENT ACTIVITY 5

SAFETY WITH THE SMALL GAS ENGINE

(To Be Used With the Audiovisual Presentation)

A. DIRECTIONS: LOOK AT THE PRESENTATION SLIDES 43-54. THIS PART OF THE PRESENTATION TALKS ABOUT SAFETY WITH THE ENGINE. THE SMALL GAS ENGINE CAN BE A DANGEROUS PIECE OF EQUIPMENT IF IT IS NOT HANDLED SAFELY.

1. WHAT ARE 2 SAFETY RULES TO FOLLOW BEFORE STARTING AN ENGINE?

   A. _____

   B. _____

2. WHAT ARE 2 SAFETY RULES TO FOLLOW WHEN CRANKING AN ENGINE?

   A. _____

   B. _____

3. WHY SHOULD YOU ALWAYS WATCH A RUNNING ENGINE?

4. WHY SHOULD YOU REMOVE THE SPARK PLUG WIRE AND SPARK PLUG FROM AN ENGINE BEFORE REPAIRING THE ENGINE?

B. DIRECTIONS: PLACE A "✓" IN FRONT OF EACH CORRECT SENTENCE.

_____ 1. AN IMPORTANT SAFETY RULE TO FOLLOW IS TO ALWAYS KNOW HOW TO STOP AN ENGINE BEFORE YOU START OR REPAIR IT.

_____ 2. ALL GAS ENGINES GIVE OFF POISONOUS FUMES CALLED CARBON MONOXIDE.

_____ 3. THE SAFE WAY TO LEARN HOW TO STOP AN ENGINE IS TO START IT AND THEN PLAY AROUND WITH IT UNTIL IT STOPS.

_____ 4. IF YOU BREATHE TOO MUCH CARBON MONOXIDE, IT COULD KILL YOU.

_____ 5. AFTER YOU HAVE STARTED AN ENGINE, ITS OKAY TO LEAVE IT RUNNING AND DO SOMETHING ELSE.

_____ 6. WHEN STARTING A LAWNMOWER, YOU DON'T NEED TO CHECK UNDER THE BLADES FOR LOOSE TOOLS.

_____ 7. THE SPARK PLUG IS THE KEY THAT MAKES THE ENGINE RUN.

_____ 8. IT'S A GOOD IDEA TO ALWAYS REMOVE THE SPARK PLUG AND SPARK PLUG WIRE BEFORE WORKING ON AN ENGINE.

_____ 9. SAFETY IS NOT THE MOST IMPORTANT THING THAT YOU NEED TO LEARN TO BECOME A SMALL ENGINE MECHANIC.

STUDENT ACTIVITY 6

SAFETY INSPECTION CHECKLIST

DIRECTIONS: TAKE A TOUR OF YOUR REPAIR SHOP. USING THE FOLLOWING CHECKLIST, LOOK FOR THE SAFETY EQUIPMENT AND PRECAUTIONS IN YOUR SHOP. CHECK "✓" YES IF YOU FIND EACH ITEM OR NO IF YOU DO NOT FIND IT.

YES	NO	TOOL ROOM
		1. SAFETY GLASSES ARE READY TO WEAR.
		2. TOOLS ARE SHARP, CLEAN, AND IN SAFE WORKING ORDER.
		3. TOOL ROOM IS NEAT AND STRAIGHT.
		4. APPROVED METAL CAN FOR OILY SHOP TOWELS.
		5. APPROVED SAFETY GASOLINE CAN.

		SHOP AREA
		1. FIRE EXTINGUISHERS ARE CLOSE BY.
		2. EXHAUST VENTS IN SHOP.
		3. FLOORS ARE CLEAN (THERE IS NO OIL OR GASOLINE ON THEM)
		4. WORK AREAS ARE CLEAN AND TOOLS HAVE BEEN PUT UP.

STUDENT ACTIVITY 7

SAFETY TEST

DIRECTIONS: PLACE AN "S" IN FRONT OF EACH SENTENCE THAT DESCRIBES A SAFE SHOP PRACTICE OR A "U" IF THE SENTENCE DESCRIBES AN UNSAFE SHOP PRACTICE.

_____ 1. WEAR A NECKTIE OR DANGLING NECKLACE AND LOOSE, BAGGY CLOTHES TO WORK IN THE SHOP.

_____ 2. PAY ATTENTION TO YOUR OWN WORK AND DON'T GET DISTRACTED BY SOMEONE ELSE.

_____ 3. GASOLINE SHOULD BE STORED IN AN APPROVED SAFETY CAN.

_____ 4. AFTER YOUR WORK IS DONE AND THE WORK AREA IS CLEAN AND TOOLS ARE PUT AWAY, RUN AND HORSEPLAY IN THE SHOP WITH YOUR FRIENDS.

_____ 5. IT'S MORE IMPORTANT TO FINISH YOUR WORK QUICKLY THAN TO SPEND EXTRA TIME NEEDED TO FOLLOW THE SAFETY RULES.

_____ 6. WHEN USING CARBURETOR CLEANER, WEAR SAFETY GLASSES AND TURN ON THE AIR IN THE SHOP.

_____ 7. ON A HOT DAY, USE THE AIR HOSE TO COOL YOURSELF OFF.

_____ 8. PUT GASOLINE INTO A HOT, RUNNING ENGINE.

_____ 9. WEAR SAFETY GLASSES WHEN USING COMPRESSED AIR.

_____10. USE A CLUTCH WRENCH AND FLYWHEEL HOLDER INSTEAD OF A HAMMER FOR REMOVING A STARTER CLUTCH.

_____11. IF GASOLINE IS SPILLED ON THE FLOOR OR ENGINE AND YOU ARE IN A HURRY, THEN LEAVE IT ALONE BECAUSE IT WILL DRY UP QUICKLY.

_____12. WHEN STARTING AND RUNNING AN ENGINE IN THE SHOP, TURN ON THE AIR.

_____13. THROW OILY SHOP TOWELS AND RAGS AWAY WITH OTHER TRASH.

_____14. USE PLIERS TO REMOVE A STUCK SPARK PLUG.

_____15. AFTER WORKING ON A LAWNMOWER, FIRST CHECK UNDERNEATH IT FOR LOOSE TOOLS AND THEN START IT.

_____16. REMOVE THE SPARK PLUG WIRE AND SPARK PLUG BEFORE PUTTING IN A NEW SET OF CONTACT POINTS ON AN ENGINE.

_____17. USE ANOTHER TOOL THAT MAY BE THE WRONG SIZE, IF THE RIGHT TOOL THAT YOU NEED IS BEING USED BY SOMEONE ELSE.

_____18. WHEN YOU ARE IN THE SHOP, YOU ONLY NEED TO KNOW WHAT THE SAFETY RULES ARE AND YOU DON'T NEED TO PRACTICE THEM BECAUSE YOUR TEACHER WILL MAKE SURE YOU DON'T GET HURT.

ANSWERS TO STUDENT ACTIVITIES

NOTE: Responses to the short answer questions may vary according to the student's level of understanding, experience, and ability to express oneself. The following answers are provided as examples of the kind of information that a student could give.

STUDENT ACTIVITY 1: WHAT IS SAFETY?

A. Safety is a way of life such as picking things up off the floor, stopping your car at every "Stop" sign, and wearing safety glasses in the shop.

B.

✓	1.	✓	5.
✓	2.		6.
	3.	✓	7.
✓	4.	✓	8.

STUDENT ACTIVITY 2: A SAFE ATTITUDE

A. 1. Wearing safety glasses

2. Wearing protective clothes that are not loose and baggy and no dangling jewelry.

3. Paying attention to your work and not getting distracted.

4. Not horseplaying in the shop.

5. Understanding and being on guard for the hazards of your job like practice using tools correctly.

B.

	1.		6.
✓	2.		7.
	3.	✓	8.
✓	4.		9.
✓	5.		10.

STUDENT ACTIVITY 3: SAFETY WITH SMALL ENGINE MATERIALS

A. 1. Gasoline should be stored in an approved safety can.

2. a. Turn off the engine

b. Let the engine cool down

3. Wipe up spilled gasoline with shop towels and not with water.

4. Put oily shop towels in an approved storage container.

B. ✓ 1. ✓ 3.

____ 2. ✓ 4.

STUDENT ACTIVITY 4: SAFETY WITH HAND TOOLS

A. 1. F 5. T

2. T 6. F

3. T 7. T

4. F 8. T

B. 1. d 4. e

2. h 5. b

3. f

STUDENT ACTIVITY 5: SAFETY WITH THE SMALL GAS ENGINE

A. 1. a. Move the engine outside or make sure that shop area is well ventilated.

b. Check under the engine for loose tools and other objects that could fly up from the moving blades.

2. a. Brace yourself against the engine.

b. Hold onto the rope while it is rewinding into the engine.

3. You should always watch a running engine because it might get out of control and cause an accident or be damaged.

4. You should remove the spark plug wire and spark plug from an engine before repairing the engine so that it won't accidentally start.

B. ✓ 1. ____ 6.

✓ 2. ✓ 7.

____ 3. ✓ 8.

✓ 4. ____ 9.

____ 5.

STUDENT ACTIVITY 6: SAFETY INSPECTION CHECKLIST

Each student should be able to recognize and find each piece of safety equipment and precaution in the repair shop. If the student is unable to do this, show the student where the equipment is or what is meant by the safety precaution. Repeat this activity.

STUDENT ACTIVITY 7: SAFETY TEST

U 1.	S 10.
S 2.	U 11.
S 3.	S 12.
U 4.	U 13.
U 5.	U 14.
S 6.	S 15.
U 7.	S 16.
U 8.	U 17.
S 9.	U 18.

EVALUATION CHART

The chart on the following page is to be used by the teacher as a motivational aid and by the students as a self-evaluation of individual progress toward becoming safety conscious and practicing the safety rules while learning the small engine repair jobs. Evaluation of safety practices should last throughout the school year, but for purposes of completing the unit on Safety, the evaluation may only last for one or two weeks.

The rating scales for the evaluation form are divided into 3 steps. These steps are:

Rating	Meaning
1 =	Does not follow the safety rule
2 =	Sometimes follows the safety rule, but needs to be reminded
3 =	Follows the safety rule most of the time

Criterion for competency or the rating that a student must achieve for a predetermined length of time is suggested to be a rating of 3 on the evaluation chart for three consecutive days. For example, when a student demonstrates the safety rule without being reminded for three consecutive days, then the student has reached criterion and is considered competent in that safety area.

SMALL ENGINE REPAIR SAFETY RULES CHART	STUDENT'S NAME _____ Days									
	1	2	3	4	5	6	7	8	9	10
Safe Attitude										
1. Wears protective clothes that are not baggy										
2. Does not wear jewelry										
3. Wears safety glasses when needed										
4. Pays attention to own work										
5. Does not horseplay in shop										
6. Is on guard for hazards of job										
7. Other:										
8. Other:										
9. Other:										
Safety With Materials										
10. Stores gasoline in approved safety cans										
11. Turns off engine and lets it cool before putting in gasoline										
12. Cleans up spilled gasoline with shop towel										
13. Stores oily shop towels in approved storage cans										
14. Uses carburetor cleaner in vented area										
15. Other:										
16. Other:										
Safety With Hand Tools										
17. Does not play with air hose										
18. Uses correct tool for job										
19. Uses right size tool for job										
20. Other:										

66

SMALL ENGINE REPAIR SAFETY RULES CHART	Days									
	1	2	3	4	5	6	7	8	9	10
Safety With Engine										
23. Starts engine in vented area										
24. Before starting, checks under engine for loose tools, feet, and other										
25. Braces self on engine when cranking										
26. Holds on to starter rope when it is rewinding into engine										
27. Removes spark plug before working on engine										
28. Other:										
29. Other:										
30. Other:										

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